1 Introduction

Some big questions:

• What is the role of quantity in language and cognition and how does it interact with interpretation?

• What does the domain of individuals look like? How is it structured?

The more modest goals for today:

• Draw an analogy within the domain of eventualities between states and events.

• Argue that quantity representations matter to the interpretation of states.

• Suggest an aspectual theory of some kinds of existential interpretation.

1.1 The Phenomenon

1.1.1 Event Interpretation and State Interpretation

Telicity A distinguishing property of events: the availability of a telic interpretation which affects the possibility of endpoint modification (Dowty 1979; Vendler 1957).

• Telic events like (1a) license telic interpretation.

• Atelic events like (1b) fail to license telic interpretation.

(1) a. The volcano erupted in an hour.
b. The volcano steamed *in an hour.
Existential Interpretation  A distinguishing property of states: the availability of existential interpretation of subjects (EIS) which effects the interpretation of bare plurals (Carlson 1977; Kratzer 1995).\(^1\)

- Stage-level states like (2a) license EIS.
- Individual-level states like (2b) do not license EIS.

(2)  
  a. Firemen are available. \hspace{5em} (EIS)  
  b. Firemen are altruistic. \hspace{5em} (*EIS)

1.1.2 Object Effects in Events and States

Objects and Telicity  Whether an event licenses a telic interpretation or not depends in part on the presence and type of its direct object (Verkuyl 1972; Rosen 1999).

(3)  
  a. John ran *in ten minutes.  
  b. John ran miles *in ten minutes.  
  c. John ran this mile in ten minutes.

- The distinction between (3b) and (3c) has been taken as strong evidence against telicity as a lexical property of (eventive) verbs (Verkuyl 1972).

Objects and Existential Interpretation  This appears to also be the case concerning the availability of EIS (based on cases cited in Fernald 1994, 2000).

(4)  
  a. Students understand. \hspace{5em} (*EIS)  
  b. Students understand homework. \hspace{5em} (*EIS)  
  c. Students understand this homework. \hspace{5em} (EIS)

- I take the distinction between (4b) and (4c) to argued against the stage-level/individual-level distinction as a lexical property of (stative) verbs.

\(^1\) Existential interpretation also affects weak nominals (i) and indefinites (ii). In particular, some can be phonetically reduced in (ia) but not (ib).

(i)  
  a. Many/some/three fireman are available. \hspace{5em} (cardinal possible)  
  b. Many/some/three fireman is altruistic. \hspace{5em} (partitive only)

(ii)  
  a. A fireman is available. \hspace{5em} (individual possible)  
  b. A fireman is altruistic. \hspace{5em} (kind only)
1.1.3 Scalar Effects in Events and States

**Scales and Telicity**  Events can also license a telic interpretation if they are built on closed scales of change (Hay, Kennedy & Levin 1999; Kennedy & Levin 2008).

(5)  a. *completely deep (open scale)
    b. completely empty (closed scale)

(6)  a. The recession deepened *in several years.
    b. The sink emptied in a few minutes.

**Scales and Existential Interpretation**  This appears to also be the case for the availability of EIS (Husband 2012).

(7)  a. *completely tall (open scale)
    b. completely drunk (closed scale)

(8)  a. Norwegians are tall. (*EIS)
    b. Norwegians are drunk. (EIS)

**QUESTIONS:**

- How to account for the alternation of the availability of EIS?
- What does this account tell us about the relationship between events and states?
- What does this account tell us about the nature of the domain of individuals?

1.2 Roadmap

i. Discuss theories of object effects.
   - Argue for an event composition theory.
   - Propose an analysis of object effects in states.

ii. Discuss scalar effects in events and states.
   - Argue for a quantity theory of scales.
   - Propose an analysis of scalar effects in states.

iii. Discuss the interpretation of subjects in light of these analyses.

iv. Extend the analysis to other related aspecutal phenomena.

v. Offer some conclusions and point to some potential difficulties.
2 A Theory for Object Effects

2.1 Previous Accounts

2.1.1 Event Composition: An Account of Eventive Object Effects

Starting with Verkuyl (1972), previous accounts of eventive object effects have argued that telicity arises from the composition of the verb and its object.

- A wide range of objects have been considered.
  - Homogeneous (mass noun/bare plural) objects fail to license telic interpretation, (9a)–(9b).
  - Quantized objects license telic interpretation, (9c)–(9h).²

(9) a. Robby ate food *in an hour. (Mass Noun)
b. Robby ate sandwiches *in an hour. (Bare Plural)
c. Robby ate a sandwich in an hour. (Singular Indefinite)
d. Robby ate two sandwiches in an hour. (Bare Numeral)
e. Robby ate many sandwiches in an hour. (Weak Quantifier)
f. Robby ate the sandwich in an hour. (Definite)
g. Robby ate these sandwiches in an hour. (Demonstrative)
h. Robby ate every sandwich in an hour. (Strong Quantifier)

Kratzer (2004) derives the effect of objects on their event through the meaning of the accusative case.

- Accusative case enforces an Object-to-Event mapping (Krifka 1998) through the denotation given in (10) (simplifying Kratzer’s (2004) proposal for clarity of exposition).³,⁴

³ I am assuming Borger’s (2005a; 2005b) definitions to distinguish between quantized and homogeneous objects, given in (44).

³ Semantic types: individuals, \( e \); eventualities, \( s \); and propositions, \( t \).

³ Variables: over individuals, \( x \) and \( y \); over eventualities, \( e \) for events and \( s \) for states.

³ Kratzer’s (2004) final proposal for the meaning of ACC takes non-trivial part structures of objects into account which are often at stake when determining telicity. She supplies a measure function \( f \) and suggests that “general cognitive mechanisms” determine the proper measuring function of the object referent.

³ ³ [ACC] = \[ \lambda R_{(e,(x,y))} \lambda x \lambda e [R(x)(e) \& \exists f \{ \text{measure}(f) \& \forall e' [x' \leq f(x) \rightarrow \exists e' [e' \leq e \& R(x')(e')]]] \]
Quantity in States

- The Object-to-Event mapping constructs a homogeneous event whenever the part-structure of the object is homogeneous.
- The Object-to-Event mapping constructs a quantized event whenever the part-structure of the object is quantized.

\[
\text{[ACC]} = \lambda R(e, s, t) \lambda x \lambda e [R(x)(e) \& \forall x' \exists e' [x' \leq x \rightarrow e' \leq e \& R(x')(e')]]
\]

- Accusative case enters into the composition of the VP as shown in (11).

\[
\text{(11)}
\]

2.1.2 Requiring Topics: An Account of Stative Object Effects

Starting with Glasbey (1997), previous approaches have focused on the role of discourse in licensing EIS.

- Jäger (2001) proposes that the distinction is linked to a topic requirement. “Discourse linking principle: Every atomic clause has a topic.”
- Kratzer & Selkirk’s (2007) refinement of Jäger (2001): “The source of the syntactic differences is the requirement that there must be a syntactically represented topic.”

\[
\text{(12) a. Ich weiss, dass} \text{ dies} \text{es} \text{Haus} \text{ Maffiosi besitzen. (EIS)}
\]
\[
\text{I know that this house mafia.members own}
\]
\[
\text{‘I know that mafia members own this house.’}
\]
\[
\]
(13) a. Ich weiss, dass Maffiosi Häuser besitzen. (*EIS)
   ‘I know that mafia members own houses.’

b. ??Ich weiss, dass Häuser Maffiosi besitzen.
   ‘I know that houses mafia members own’


• In (12a), the topic is a scrambled discourse-given object *dieses Haus* ‘this house’.
  – The subject *Maffiosi* ‘mafia members’ may remain low and be non-topicial (12b).

• In (13a), the topic can only be the subject *Maffiosi* ‘mafia members’.
  – The object *Häuser* is not discourse-given and cannot scramble (13b).
  – The subject *Maffiosi* ‘mafia members’ must raise to topic position, becoming a topic (13c).

2.2 Predictions and Investigations

The Event Composition Approach

• Object effects arise from the quantization of the object and its interaction with event structure.
  • Homogeneous objects (bare plurals/mass nouns) create homogeneous (atelic) events. Quantized objects create quantized (telic) events.

The Requiring Topics Approach

• Object effects are conditioned by the ability of the object to function as a topic.
  • To be a topic, the object must be strong. Weak objects cannot be topics (Jäger 2001).

5 Kratzer & Selkirk (2007) also observe that the predicate in (12a) can be deaccented, whereas an accent on the predicate in (13a) is required.
Quantity in States

<table>
<thead>
<tr>
<th>Mass Noun, Weak Numeral, Strong Determiner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Plural</td>
</tr>
<tr>
<td>quantization</td>
</tr>
<tr>
<td>weak/strong</td>
</tr>
</tbody>
</table>

• Event composition accounts depend on the distinction being made around the presence of quantized/homogeneous objects.

• Requiring Topics accounts depend on the distinction being made around the presence of weak/strong objects.

• For telicity, the case is clear. Quantization of the object determines the telicity of the event.

• However, the available data on EIS has only examined bare plural objects (homogeneous and weak) and demonstrative objects (quantized and strong).
  – These two cases cannot distinguish between Event Composition and Requiring Topics approaches.
  – Data on a wider range of object types is needed.

**QUESTION**: What types of objects license/fail to license EIS?

### 2.2.1 Objects Effects Revisited

Bare numerals can license EIS, though only marginally.

(14)  
  a. Monkeys live in three trees. (?EIS)  
  b. Tycoons own two banks.  (?EIS)

Singular indefinites can license EIS, also marginally.6

(15)  
  a. Monkeys live in a tree. (EIS)  
  b. Tycoons own a bank. (EIS)

Weak quantifiers can license EIS.

6 The singular indefinite subject may sharpen the acceptability of EIS given a singular indefinite object.

(i)  
  a. A monkey lives in a tree.  
  b. A tycoon owns a bank.
E.M. Husband

(16) a. Monkeys live in several trees. (EIS)
b. Tycoons own several banks. (EIS)
(17) a. Monkeys live in many trees. (EIS)
b. Tycoons own many banks. (EIS)

The following table groups and summarizes the data for both states and events.

<table>
<thead>
<tr>
<th>Mass Noun/ Bare Plural</th>
<th>Weak Determiners/ Numerals</th>
<th>Weak-Strong Quantifiers/ Strong Determiners</th>
</tr>
</thead>
<tbody>
<tr>
<td>*EIS</td>
<td>?EIS</td>
<td>EIS</td>
</tr>
<tr>
<td>*in X time</td>
<td>in X time</td>
<td>in X time</td>
</tr>
</tbody>
</table>

- Weak quantifiers, which cannot be topics but are quantized, license EIS.
- Weak determiners and numerals, which cannot be topics but are quantized, can license EIS (although with more difficulty).
  → Evidence against weak/strong.
  → Evidence for quantization.

Telicity and EIS are licensed by the same types of objects.

2.2.2 Generic Weak Objects

QUESTION: Are these effects driven by existential interpretation of objects?

- Need cases where object existential interpretation is controlled for.
- Cohen & Erteschik-Shir (2002) and Glasbey (2007) observe that hate does not license object EI
  - for bare plural objects, (18b), and
  - for weak objects more generally, (19b).

(18) a. John knows lawyers. (Object EI)
b. John hates lawyers. (*Object EI)
(19) a. John knows many lawyers. (Object EI)
b. John hates many lawyers. (*Object EI)

- However, EIS is available when the object is weak and quantized, (20b).

(20) a. Business men hate many lawyers. (EIS)
b. Business men hate many lawyers. (EIS)
2.2.3 Object Scrambling

Returning to Kratzer & Selkirk (2007):

- When an object scrambles to topic position, the subject remains low and receives existential interpretation (21a).
- When the object remains low, but is quantized, the subject can still receive existential interpretation (21b).

CONCLUSION: Scrambling is related to topic, but not to EIS.

(21) a. Ich weiss, dass dieses Haus Maffiosi besitzen. (EIS)
   I know that this house mafia.members own
   ‘I know that mafia members own this house.’
   b. Ich weiss, dass Maffiosi dieses Haus besitzen. (EIS)
      I know that mafia.members this house own
      ‘I know that mafia members own this house.’

- Bare plural objects cannot scramble (22a).
- Bare plural objects do not license EIS (22b).

(22) a. *Ich weiss, dass Häuser Maffiosi besitzen.
   I know that houses mafia.members own
   b. Ich weiss, dass Maffiosi Häuser besitzen. (*EIS)
      I know that mafia.members houses own
      ‘I know that mafia members own houses.’

2.2.4 Extraction from Objects

Kratzer & Selkirk (2007) also propose that a syntactically represented topic is derived by movement.

- By moving the object to topic position, the subject can stay low and receive EI.

Freezing Condition: Movement can be blocked when a subconstituent has already been moved (Wexler & Culicover 1980).

- Extraction from an object should block movement of object to topic position.
- Thus the subject should have to raise to topic position, blocking EIS.
Extraction from objects does not affect EIS.

- Extraction from a quantized object does not block EIS (23).
- Extraction from a bare plural object does not keep the object low, allow it to receive EI, and thus situation the state and license EIS either (24).

(23) a. What type of tree do monkeys live in several groves of? (EIS)
    b. Which person do tycoons own many paintings of? (EIS)

(24) a. What type of tree do monkeys live in groves of? (*EIS)
    b. Which person do tycoons own paintings of? (*EIS)

Extraction from objects does not affect telicity either.\(^7\)

- Extraction from a quantized object still licenses a telic interpretation (25).
- Extraction from a homogeneous object still fails to license a telic interpretation (26).

(25) a. Which person did John paint some pictures of \(\text{in six months.}\) (EIS)
    b. What did the students solve many problems about \(\text{in an hour.}\)

(26) a. Which person did John paint pictures of \(\text{*in six months.}\) (*EIS)
    b. What did the students solve problems about \(\text{*in an hour.}\)

2.2.5 **Interim Conclusion 1**

The Event Composition approach better captures the availability of EIS.

- Quantized objects license EIS.
- Homogeneous objects fail to license EIS.

\(^7\) The syntactic relationship between the object and AspP may be one of Agree and not Move (MacDonald 2008).
2.3 The Analysis of Object Effects

Goal: Capture the similarity between the conditions which license EIS and those which license telicity.

- Proposal: Eventive VPs and stative VPs both compose in the same way, through the meaning of the accusative case, (27).

  - This captures the similarity between eventive and stative VPs.

\[(27) \quad \lambda x\lambda s[R(x)(s) \land \forall x'[x' \leq x \rightarrow \exists s'[s' \leq s \land R(x')(s')]]\]

Example of a homogeneous stative VP (28) and a quantized stative VP (29).

\[(28) \quad \lambda s[own(s)(banks) \land \forall x'[x' \leq banks \rightarrow \exists s'[s' \leq s \land own(x')(s')]]\]

\[(29) \quad \lambda s[own(s)(this-bank) \land \forall x'[x' \leq this-bank \rightarrow \exists s'[s' \leq s \land own(x')(s')]]\]

We will return to why these representation affect EIS in section 5

3 The Case of Scalar Effects

Recall that the scale structure of adjectives affects the availability of EIS in states.

\[(30) \quad \begin{align*}
a. & \text{ Whiskey bottles are full.} \quad \text{(EIS)} \\
b. & \text{ Norwegians are drunk.} \quad \text{(EIS)} \\
c. & \text{ Rules are necessary.} \quad \text{(EIS)}
\end{align*}\]

\[(31) \quad \begin{align*}
a. & \text{ Whiskey bottles are brown.} \quad \text{(*EIS)} \\
b. & \text{ Norwegians are tall.} \quad \text{(*EIS)} \\
c. & \text{ Rules are immoral.} \quad \text{(*EIS)}
\end{align*}\]

Proportional modifiers are acceptable only with adjectives which map their arguments onto a maximum or minimum point on a scale.\(^8\)

\[(32) \quad \begin{align*}
a. & \text{ completely full/drunk/necessary} \\
b. & \text{?completely brown/tall/immoral}
\end{align*}\]

Question: Why is there this relationship between scale structure and EIS?

\(^8\) Other properties of scale structure, including a new view of the positive form, are reviewed in Appendix C.
3.1 Scale Structure in Events

Degree achievements are eventive predicates derived from adjectives.

- Some have only an atelic interpretation, (33), or telic interpretation, (34) (Kearns 2007).
- Others have either a telic interpretation or an atelic interpretation, (35) and (36), respectively.
  - Variable behavior is ameliorated by proportional modifiers and measure phrases, (37) and (38).

(33) a. The gap between the boats widened for/?in a few minutes.
    b. The recession deepened for/?in several years.

(34) a. The sky darkened ??for/ in an hour.
    b. The shirt dried ??for/ in several hours.
    c. The sink emptied ??for/ in a few minutes.

(35) a. The soup cooled in 10 minutes.
    b. The ship sank in an hour.

(36) a. The soup cooled for 10 minutes.
    b. The ship sank for an hour.

(37) a. The soup completely cooled ??for/in an hour.
    b. The basin filled halfway ??for/in an hour.

(38) a. The soup cooled 17 degrees ??for/in an hour.
    b. The gap widened 6 inches ??for/in an hour.

Degree achievements are a function that measures the degree to which an object undergoes change of a scalar property through its participation in the event (Kennedy & Levin 2008).

- A degree achievement denotes a measure of change function, type \langle e, \langle s, d \rangle \rangle, (39).\textsuperscript{9}
- The measure of change function must combine with some degree morphology to derive a property of events, (40).

\textsuperscript{9} Adjectival denotations are relativized to events, type \langle e, \langle s, d \rangle \rangle
Measure of change  
For any measure function $m$, $m_\Delta = \lambda x \lambda e. m^\dagger_{m(x)(\text{init}(e))}(x)(\text{fin}(e))$

$\text{pos}_v = \lambda g \in D_{m_\Delta} \lambda x \lambda e. [g(x)(e) \succeq \text{stnd}(g)]$\(^{10}\)

The following are examples of an atelic degree achievement, (41), and a telic degree achievement, (42).

(41)  
\begin{enumerate}[a.]  
  \item The gap widened.  
  \item $\lambda e. \text{wide}_\Delta(\text{the-gap})(e) \succeq \text{stnd}(\text{wide}_\delta)$  
\end{enumerate}

(42)  
\begin{enumerate}[a.]  
  \item The rope straightened.  
  \item $\lambda e. \text{straight}_\Delta(\text{the-rope})(e) \succeq \text{stnd}(\text{straight}_\delta)$  
\end{enumerate}

- Telicity of degree achievements is sensitive to scale structure underlying the meaning of the adjective.
- **Question**: Why?

“The difference between adjectives that use closed measurement scales and those that use open ones is that the former come with ‘natural transitions’: the transition from a zero to a non-zero degree on the scale (from not having any degree of the measured property to having some of it) in the case of an adjective with a lower closed scale, or the transition from a non-maximal to a maximal degree (from having an arbitrary degree of the measured property to having a maximal degree of it) in the case of an adjective with an upper closed scale.”

*(Kennedy & Levin 2008: p. 169)*

- What is a ‘natural transition’?  
- Are natural transitions a type of quantity, i.e. a quantized degree?

\(^{10}\) stnd is “a function from gradable adjective meanings to degrees that returns the standard of comparison, the minimum degree required to stand out in the context relative to the kind of measurement expressed by the adjective” *(Kennedy & Levin 2008).*
3.2 Quantity of Scales

Kennedy & Levin (2002) proposed that the telic interpretation of degree achievements resulted from a quantized degree.

(43) Kennedy-Levin Extension: Scale structure is a case of quantity.

• Question: Can we show that scale structure is related to quantity (44) (Borer 2005a,b)?

(44) a. Quantized: P is quantized iff P is not homogeneous.
   b. Homogeneous: P is homogeneous iff P is cumulative and divisive.
      i. P is cumulative iff \( \forall x, y[P(x) \& P(y) \rightarrow P(x \cup y)] \)
         P is cumulative iff for all x and y with property P, the union of x and y also has property P.
      ii. P is divisive iff \( \forall x[P(x) \rightarrow \exists y[P(y) \& y < x] \& \forall x, y[P(x) \& P(y) \& y < x \rightarrow P(x - y)] \]
         P is divisive iff for all x with property P there is a proper part y of x which also has property P, and for all x and y with property P if y is a proper part of x then the subtraction of y from x also has property P.

(45) A degree \( d \) is a convex nonempty subset of a scale \( S \) such that

\[ \forall p_1, p_2 \in d, \forall p_3 \in S, p_1 < p_3 < p_2 \rightarrow p_3 \in d \]

(46) For all degrees \( d_1, d_2 \) of a scale \( S \),
   a. Part of Degree: \( d_2 \leq d_1 = \text{def } d_1 \cup d_2 = d_1 \)
   b. Proper Part of Degree: \( d_2 < d_1 = \text{def } d_1 \neq d_2 \& d_1 \cup d_2 = d_1 \)
   c. Subtraction of Degrees: \( d_1 - d_2 = \text{def } d_1/d_2 \)

3.2.1 Open Scales

Open scales are homogeneous (both cumulative and divisive).

(47) a. Anthony is tall. \( \text{tall}(a) \succ \text{stnd}(\text{tall}) \)
   b. Cleopatra is tall. \( \text{tall}(c) \succ \text{stnd}(\text{tall}) \)

• Cumulative:
   – There is a degree \( d_a = \text{tall}(a) \) and a degree \( d_c = \text{tall}(c) \), and \( d_a \succ \text{stnd}(\text{tall}) \) and \( d_c \succ \text{stnd}(\text{tall}) \).
   – Suppose that Anthony was taller than Cleopatra, such that \( d_a \succ d_c \).
Quantity in States

– Does \( d_a \cup d_c \) yield a degree of tallness? Since \( d_a \cup d_c = d_a \), and \( d_a \) is the degree of height of Anthony, then \( d_a \) is a degree of tallness.

– Open scales are cumulative.

• Divisive:
  
  – There is a degree \( d_a \succ \mathsf{stnd}(\text{tall}) \).
  
  – Since degrees are convex (dense), there is a degree \( d_b < d_a \) such that \( d_b < d_a \) and \( d_b \succ \mathsf{stnd}(\text{tall}) \), satisfying divisive’s first conjunct.
  
  – As degrees of \( S_{\text{height}} \), \( d_a = (0, p_a) \), \( d_b = (0, p_b) \), and \( p_b \) is less than \( p_a \). Then \( d_b - d_a = [p_b, p_a) \). Note of course that this degree contains values which are all heights that count as tall, satisfying divisive’s second conjunct.

  – Having satisfied both conjuncts, open scales are divisive.

3.2.2 Closed Scales

Closed scales are quantized (cumulative but not divisive).

\begin{align*}
(48) \quad &\text{a. The bottle is full. } \quad \text{full}(b) = \max(\text{full}) \\
&\text{b. The cup is full. } \quad \text{full}(c) = \max(\text{full})
\end{align*}

• Cumulative:

  – There is a degree \( d_b = \text{full}(b) \) and a degree \( d_c = \text{full}(c) \), and \( d_b = \max(\text{full}) \) and \( d_c = \max(\text{full}) \).

  – Note that since the scale of extent is (totally) closed, \( S_{\text{extent}} = [0, 1] \), \( d_b = d_c = [0, 1] \).

  – Then \( d_b \cup d_c = [0, 1] \), which is the maximum degree.

  – Closed scales are cumulative.

• Divisive:

  – There is a degree \( d_b = \max(\text{full}) \).

  – Since \( d_b = [0, 1] \), i.e. the maximum degree of extent, then there cannot be a degree \( d_a \) such that \( d_a < d_b \) and \( d_a = \max(\text{full}) \), as any proper part of \( d_b \) will fail to include the maximum point on the scale.

  – Closed scales fail to satisfying divisive’s first conjunct.

  – Closed scales are not divisive.

Confirming (43), scale structure is a species of quantity.
3.3 The Analysis of Scalar Effects in States

Two approaches:

• $pos_v$ Mapping

• Case on Predicative Adjectives

3.3.1 $pos_v$ Mapping

• Derives the two types of predicative adjectives through the meaning of the degree morpheme.
  
  – Adjectives are measure functions.
  
  – $pos_v$ enforces a mapping to events (Krifka 1998), (49).
  
  – Predicative adjectives are composed as in (50).
    
    * The mapping to events derives a homogeneous state whenever the part-structure of the degree is homogeneous.
    
    * The mapping to events derives a quantized state whenever the part-structure of the degree is quantized.

$(49) \quad [pos_v] = \lambda g \in D_m \lambda s.\exists x[g(x)(s) \succeq \text{std}(g) \& \\forall d'[d' \leq g(x)(s) \& d' \succeq \text{std}(g) \rightarrow \exists s'[s' < s \& g(x)(s') = d']]$  

Mapping to Eventualities

$(50)$

\[
\langle s, t \rangle \\
\xrightarrow{pos_v(\langle e, (s, d) \rangle, (s, t))} A\langle e, (s, d) \rangle
\]

$(51)$

a. $[pos_v \, \text{brown}] = \lambda e.\exists x[\text{brown}(x)(s) \succeq \text{std}(\text{brown}) \& \forall d'[d' \leq \text{brown}(x)(s) \& d' \succeq \text{std}(\text{brown}) \rightarrow \exists s'[s' < s \& \text{brown}(x)(s') = d']]$

b. $[pos_v \, \text{full}] = \lambda e.\exists x[\text{full}(x)(s) \succeq \text{std}(\text{full}) \& \forall d'[d' \leq \text{full}(x)(e) \& d' \succeq \text{std}(\text{full}) \rightarrow \exists s'[s' < s \& \text{full}(x)(s') = d']]$
3.3.2 Case on Predicative Adjectives

- Derives the two types of predicative adjectives through the meaning of accusative case (Krater 2004).
  
  - Adjectives are measure functions.
    
    * $pos$ combines with the adjective to derive a property of individuals.
    
    * $nom$ operator, $\cap$, type shifts a property of individuals, type $\langle e, t \rangle$, to individuals, type $e$, (52) (Chierchia 1984; Partee 1987).
    
    * This, roughly, derives the meaning of ‘brownness’ and ‘fullness’, i.e. all the possible ways an individual can be brown/full, (53a) and (53b).

  \[(52)\] 
  \[\cap e \cap \langle e, t \rangle \txt{pos} A_{\langle e, d \rangle} \]

  \[(53)\]
  \[\cap pos \txt{brown} = \cap \lambda x. x \geq \txt{stnd}(\txt{brown})\]
  \[\cap pos \txt{full} = \cap \lambda x. x \geq \txt{stnd}(\txt{full})\]

- Accusative case enforces a mapping to events (Krifka 1998), (54).

- Copula verbs denote the $be$ relation between an individual and an eventuality, (55).

- Predicative adjectives are composed as in (56).
  
  * The mapping to events derives a homogeneous state whenever the part-structure of the degree is homogeneous.
  
  * The mapping to events derives a quantized state whenever the part-structure of the degree is quantized.

  \[(54)\] \[\lambda e R_{\langle e, \langle s, t \rangle \rangle} \lambda x \lambda e[R(x)(e) \& \exists f[\text{measure}(f) \& \forall x' [x' \leq f(x) \rightarrow \exists e'[e' \leq e \& R(x')(e')]]]]\]

  \[(55)\] \[\lambda x \lambda s be(x)(s)\]
Evidence for Case on Predicative Adjectives  Case on predicative adjectives is cross-linguistically attested.

- Russian adjectives have both long and short forms, (58).

(58)  a. Long forms: bol’naja  sick.FEM-LF
      golodnym  hungry.MASC-LF
      búrnaja  turbulent.FEM-LF

  b. Short forms: bol’na  sick-SF
      goloden  hungry-SF
      spokójna  calm-SF

- Long form adjectives are individual-level (homogeneous states), (59).
- Short form adjectives are stage-level (quantized states), (60).

(59)  a. Ona bol’naja.
      She  ill-LF
      ‘She is ill (a sick person, an invalid).’
      (Soschen 2002)

  b. Ivan byl  golodnym
      Ivan was hungry-LF
      ‘Ivan was (a) hungry (man).’

  c. Reká búrnaja.
      River turbulent-LF
      ‘The river is (a) turbulent (one).’
      (Roy 2006)
Quantity in States

(60)  a. Ona bol'na.
      She ill-SF
      ‘She is ill (temporarily).’  (Soschen 2002)

b. Ivan byl goloden.
      Ivan was hungry-SF
      ‘Ivan was hungry.’

c. Segódnja reká spokójna.
      Today river calm-SF
      ‘Today the river is calm.’  (Roy 2006)

Long form adjectives bare nominative or instrumental case

• Traditionally, nominative marked adjectives denote permanent states, (61a), while instrumental marked adjectives denote temporary states, (61b).

• Roy (2006) notes that nominative marked adjectives can denote temporary properties and instrumental marked adjectives can denote permanent properties, (62).

(61)  a. Mari byla umnaja.
      Mary was intelligent.NOM-LF
      ‘Mary was intelligent.’

b. Mari byla umnoj.
      Mary was intelligent-INSTR-LF
      ‘Mary was intelligent.’

(62)  a. Oná byla sestraja / sestrój Polevogo.
      She was sister-NOM-LF / sister-INSTR-LF
      ‘She was Polevoi’s sister.’

b. Zoluška byla bedjana krest’janka / bednoj
      Cinderella was poor-NOM-LF peasant.NOM / poor-INSTR-LF
      krest’jankoj.
      peasant.INSTR
      ‘Cinderella was a poor peasant.’

The distinction appears to be between long form and short form adjectives only.¹¹

¹¹ Roy (2006) uses the case distinction in Russian long form adjectives, along with other evidence, to argue implicitly that individual-level predicates come in two types, which she calls characteristic and defining predicates, marked by instrumental and nominative case respectively.
3.4 Arguments in Adjectival Predicates

Compared to verbs, much less work has been done on adjectival argument structure.

- Research on evaluative adjectives is one exception.

(63) Evaluative adjectives in English \(^{(\text{Landau 2009})}\)

rude, mean, clever, smart, nice, kind, silly, imprudent, impolite, generous, courteous, cruel, mad, mischievous, considerate, humane, pretentious, humble, modest, sadistic, masochistic, intelligent, stupid, dumb, idiotic, noble, cowardly, cunning, farsighted, skillful, selfish, crazy, foolish

- The arguments of evaluative adjectives have three types of alternations \((\text{Cinque 1990; Stowell 1991; Bennis 2000, 2004; Landau 2006, 2009})\).
  - The external argument of (64) appears as an optional PP \(\text{(of-DP)}\) in (65).
  - The internal argument of (64) cannot appear in (65).

(64) a. John was generous (to Mary).
   b. John was irritating (to Mary).
   c. John was confused (about Mary).

(65) a. That tribute was generous (of John) (*to Mary).
   b. That comment was irritating (of John (*to Mary)).
   c. John’s manner was confused (*about Mary).

- QUESTION: Does argument alternation affect the availability of EIS?
  - The examples in (64) are sensitive to Object Effects, (66).
  - The examples in (65) are also sensitive to Object Effects, (67) and (68).

(66) a. Tycoons are generous. \(^{(*\text{EIS})}\)
   b. Tycoons are generous to others. \(^{(*\text{EIS})}\)
   c. Tycoons are generous to this bank. \(^{\text{(EIS)}}\)

(67) a. Donations are generous (of tycoons). \(^{(*\text{EIS})}\)
   b. Comments are irritating (of reviewers). \(^{(*\text{EIS})}\)
   c. Tycoons’ manners are confusing. \(^{(*\text{EIS})}\)

(68) a. Those donations are generous (of tycoons). \(^{\text{(EIS)}}\)
   b. Those comments are irritating (of reviewers). \(^{\text{(EIS)}}\)
   c. Tycoons’ manners are confusing. \(^{(*\text{EIS})}\)
Quantity in States

- **QUESTION:** How do Object Effects and Scalar Effects interact?

- Note that in degree achievements, object effects override scalar effects.
  - bare plural internal arguments block telic interpretation for variable degree achievements, (69), and telic degree achievements, (70) and (71).

(69) a. The soup cooled in 10 minutes.
    b. #Soup cooled in 10 minutes.
    c. John cooled the soup in 10 minutes.
    d. #John cooled soup in 10 minutes.

(70) a. The shirt dried in 10 minutes.
    b. #Shirts dried in 10 minutes.
    c. The sun dried the shirt in 10 minutes.
    d. #The sun dried shirts in 10 minutes.

(71) a. The sink emptied in 10 minutes.
    b. #Sinks emptied in 10 minutes.
    c. Mary emptied the sink in 10 minutes.
    d. #Mary emptied sinks in 10 minutes.

What about scalar effects in states?

- Evaluative adjectives are open scale, (72).
  - We cannot observe the interaction between scale structure and arguments using only evaluative adjectives.
  - However, closed scale adjectives which allow arguments are also sensitive to their arguments, (73).

(72) ??completely/half rude/mean/clever/smart/…

(73) a. Cans are full of beans. (*EIS)
    b. Cans are full of these beans. (EIS)

**Note:** This can be easily explained if we assume the accusative case analysis for predicative adjectives.

- The internal argument occupies accusative case and thus controls the mapping to events.
3.4.1 Object Agreement in Danish Predicative Adjectives

Different types of objects trigger differential object agreement in Danish, (Nyvad 2007).

- Related to topics?
  - Regardless of word order, the object is understood as the topic when the adjective agrees with the object, (74).
  - Objects that cannot be topics cannot agree with the adjective, (75) and (76).

(74) a. Dem er jeg vilde med.
    them.ACC am I crazy-PL about
    ‘I am a fan of them.’
  b. Jeg er vilde med dem.
    I am crazy-PL about them
    ‘I am a fan of them.’

(75) a. Jeg er vild med bøger.
    I am crazy-SG about books
    ‘I am a fan of books.’
  b. *Jeg er vilde med bøger.
    I am crazy-PL about books
    ‘I am a fan of books.’

(76) a. Bøgerne er Susanne vild/vilde med.
    Books-DEF are Susanne crazy-SG/crazy-PL about
    ‘Susanne is a fan of the books.’
  b. *Bøger er Susanne vild/vilde med.
    Books are Susanne crazy-SG/crazy-PL about
    ‘Susanne is a fan of the books.’

- Object agreement signals different object interpretations.
  - When present, the object is presupposed, i.e. a presupposed number of books, (77a).
  - When absent, the object may or may not be presupposed, (77b).
- Similar to participle object agreement in French (Belletti 2006).
  - When present, the object is presupposed, i.e. a set of specific typical mistakes, (78a),
Quantity in States

* When not present, the object may or may not be presupposed, (78b).

(77) a. Hvor mange bøger er du vilde med?
   How many books are you crazy-PL about
   ‘How many books are you a fan of?’

b. Hvor mange bøger er du vild med?
   How many books are you crazy-SG about
   ‘How many books are you a fan of?’

(78) a. Combien de fautes a-t-elle faites?
   How-many of mistakes she.has made-F.PL
   ‘How many mistakes has she made?’

b. Combien de fautes a-t-elle fait?
   How-many of mistakes she.has made-M.SG
   ‘How many mistakes has she made?’

• Participle object agreement has been used as evidence for AgrO, a position linked to the interpretation of aspect and case assignment (van Hout 1996; Ritter & Rosen 1998; Schmitt 1996).
  – Suppose that object quantity, not object definiteness, triggers object agreement.
  – Note that bare plural objects are unable to trigger object agreement, (75b).
  – Danish topicalization, (76), may parallel German scrambling.

3.5 Interim Summary 2

• Scale structure affects the availability of EIS for predicative adjectives.
  – Open scales cannot license EIS.
  – Closed scales license EIS.

• Scale structure is a species of quantity.
  – Open scales are homogeneous.
  – Closed scales are quantized.

• A compositional analysis similar to that given for stative verbs can capture this relationship.
4 Relationships between Quantity and Interpretation

A brief but important clarification about the relationship between quantity and interpretation.

4.1 The Availability of Telicity

QUESTION: How tight is the relationship between quantity and telicity?
AT ISSUE: Are there quantized events that nevertheless permit an atelic interpretation?

• Indeed, most all of them!
  – So-called activity verbs resist a telic interpretation unless the event described conceptually allows for a telic event, (79).
  – Tests for atelic interpretation like for x time are often acceptable with interruptive or iterative readings, (80).

(79) a. John pushed these carts *in three minutes.
    b. Mary pushed a button in three minutes.

(80) a. John read the book for ten minutes. (interruptive)
    b. The volcano erupted for several hours. (iterative)

• Even in the presence of a quantized predicate, a telic interpretation is not required.

• A quantized event is a necessary, but not sufficient, condition for a telic interpretation.¹²

CONCLUSION: Telic interpretations are optional with quantized events.

• What about atelic interpretations?
  – A telic interpretation can emerge only when the event is quantized.
  – Without a quantized event, only an atelic interpretation can emerge.

CONCLUSION: Atelic interpretations are obligatory with homogeneous events.

(81) quantized ← telic interpretation
     homogeneous → atelic interpretation

¹² Borer (2005b) proposes that AspP must project for a telic interpretation, but it is not required to project, say, in the presence of a quantized object (though a quantized object licenses AspP projection).
4.2 The Availability of Existential Interpretation

AT ISSUE: Are there quantized states that nevertheless license generic interpretation of their subject?

- Indeed, most all of them!
  - In general many quantized states resist EIS, (82).
  - Tests for generic interpretation like *usually* are often acceptable, (83).

(82) a. Italians like Pavarotti. (*EIS)

(83) a. Usually tycoons own banks. (*EIS)
    b. Usually tycoons own these banks. (*EIS)

- Even in the presence of a quantity predicate, EIS is not required.
- A quantized state is a necessary, but not sufficient, condition for EIS.

CONCLUSION: Existential interpretation is optional with quantized states.

- What about generic interpretations of subjects?
  - EIS can emerge only when the state is quantized.
  - Without a quantized state, only a generic interpretation of a subject can emerge.
  
  * No amount of contextual support can rescue an EIS given a homogeneous states

(84) a. This city has over 50 privately owned financial institutions. (*EIS)
    Tycoons own banks.

CONCLUSION: Generic interpretation is obligatory with homogeneous states.

(85) quantized ← existential interpretation
    homogeneous → generic interpretation

5 The Interpretation of Subjects

Up to this point, we have only concern ourselves with composition of the predicate

- In these cases, the quantity of the predicate has been inherited from that of objects or scales.
- QUESTION: How do these structures link to subjects and their interpretation?
5.1 Making Sense of Part-Structure and EIS

**GOALS:** Link the availability of EIS to the part-structure of states.\(^\text{13}\)

- **Ladusaw (1994) and McNally (1998)** both discuss stage-level/individual-level predicates in terms of thetic/categorical judgments.
  - Stage-level predicates are thetic statements, i.e. statements “about” events.
  - Individual-level predicates are categorical statements, i.e. statements “about” individuals.

However, states in general are taken to be “about” individuals (Higginbotham & Ramchand 1997; Ramchand 1997; Raposo & Uriagereka 1995).

- **QUESTION:** How are we to think about individuals and stages?

5.1.1 Domain of Individuals/Domain of Stages of Individuals

Introductions to semantics propose that nominals typically denote individuals.

\[(86)\]
\[
\begin{align*}
\text{a. } & [\text{Mary}] = m \\
\text{b. } & [\text{the book}] = b
\end{align*}
\]

\[(87)\]
\[
\begin{align*}
\text{a. } & \text{Mary read a book.} \\
\text{b. } & \exists e [\text{read-a-book}(e) \& \text{Agent}(e)(m)]
\end{align*}
\]

**Observation:** But we are not describing the individual Mary in her entirety as an Agent of a book reading.

- Instead, we are describing a stage of Mary as an Agent of a book reading.

- **Carlson (1977)** proposes a relation \(R\) to map individuals to their stages.

- Individuals are type shifted in all stage-level predicates (all eventive predicates, some stative predicates).

\[(88)\]
\[
\begin{align*}
\text{a. } & \text{Mary read a book.} \\
\text{b. } & \exists e [\text{read-a-book}(e) \& \text{Agent}(e)(R(s_m, m))]
\end{align*}
\]

Perhaps this gets things backwards. Perhaps nominals actually denote stages of individuals and not individuals themselves.

\(^{13}\)This approach is somewhat akin to suggestions from Chierchia (1998) about using parts of individuals across worlds to understand genericity.
Quantity in States

- Stages of individuals are the norm, forming the basis of domain of entities.
- Individuals must be recovered from their stages.
- **SUGGESTION**: Think about stage-level/individual-level states in terms of stages of individuals (Carlson 1977).
  - Stage-level states are statements “about” a stage of an individual.
  - Individual-level states are statements “about” all the stages of an individual.

5.1.2 Quantity and Stages

**QUESTION**: How does the quantity of the VP relate to the stages of the subject?

- When the VP is homogeneous (has a homogeneous object), the state applies to homogeneous stages of the subject.
  - As these stages compose the individual itself, no particular spatiotemporal stage of the individual is individuated and EIS is blocked.
- When the VP is quantized (has a quantized object), the state applies to only a quantized stage of the subject.
  - This quantized stage, as a particular spatiotemporal slice of the individual, guarantees existence (McNally 1998).

Under this conception, EIS is about the aspectual makeup of the individual, e.g. how the stages of an individual relate to the state.

5.2 The Mechanics

**QUESTION**: How do we relate VP quantity to the subject’s part-structure?

- **Kratzer (1996)** introduce the external argument though a Voice head using Event Identification, given in (89).
- The aktionsart of the eventuality variable selects for the thematic role of the external argument as a constraint on Event Identification.
  - Eventive eventualities select for an eventive Voice head (bearing the Agent relation).
– Stative eventualities select for a stative Voice head (bearing the Holder relation).

* Note: This distinguishes eventive and stative sentences.

- **SUGGESTION:** In addition to specifying the external argument’s relation to the stative eventuality, the stative Voice head also enforces an Event-to-Object mapping as given in (90).\(^{14}\)

  – The Event-to-Object mapping makes the individual homogeneous whenever the part-structure of the state is homogeneous.

  – The Event-to-Object mapping makes the individual quantized whenever the part-structure of the state is quantized.

(89) **Event Identification:**

\[
\begin{align*}
&f_{(e,\langle s,t \rangle)} &\quad &g_{\langle s,t \rangle} \\
&\lambda x \lambda e [f(x)(e)] &\quad &\lambda e [g(e)]
\end{align*}
\]

\[\rightarrow \quad h_{(e,\langle s,t \rangle)} \]

\[\lambda x \lambda e [f(x)(e) \& g(e)]\]

(90) \[\text{[Voice}^\text{S}] = \lambda x \lambda s [\text{Holder}(s)(x) \& \forall s'[s' \leq s \rightarrow \exists x'[x' \leq x \& \text{Holder}(s')(x')]]\]

\[\text{Event-to-Object Mapping}\]

The external argument is introduced by Event Identification as in (91).

(91)

\[
\langle s,t \rangle \\
\text{DP} \\
\langle e,\langle s,t \rangle \rangle \quad \text{(by Event Identification)}
\]

\[
\text{Voice}_{(e,\langle s,t \rangle)} \\
\langle s,t \rangle
\]

The following denotations including the external argument are given for a homogeneous state (92) and a quantized state (93) for object effects (from (28) and (29) above).

14 Evidence given in (i) suggests that a similar mapping appears to also be needed in events, although it is another Object-to-Event mapping as the part-structure of the subject affects the part-structure of the event, given in (ii).

(i) a. Settlers crossed the desert for years.

   b. #The settlers crossed the desert for years.

(ii) \[\text{[Voice}^\text{E}] = \lambda x \lambda s [\text{Agent}(e)(x) \& \forall x'[x' \leq x \rightarrow \exists e'[e' \leq e \& \text{Agent}(e')(x')]]\]

\[\text{Object-to-Event Mapping}\]
5.3 Evidence for Voice in States

Kratzer (1996) proposes that Voice preforms two functions.

- Voice introduces the external argument, and...
- Voice assigns accusative case to the object.

She suggests that the presence of Voice can be detected in different types of nominalizations.

- In \textit{of-}ing gerunds, -ing attaches to the verb, preventing assignment of accusative case to the object and thus also blocking Voice as in (96).
  
  - The genitive DP may express “a general notion of relatedness of which the agent relation is but a special case” to the event, given in (98).

- In \textit{poss-}ing gerunds, -ing attaches to the VP. Accusative case is assigned to the object and Voice must project as in (97).

15 The case analysis of predicative adjective states also follows the same derivational outlines.
– The genitive DP must express the agent relation to the event, given in (99).

(96) \[ \text{DP Maria} \ 's \ [\text{NP} \ [\text{NP} - \text{ing read} ] \ [\text{PP} \ of \ Pride \ and \ Prejudice ] ] ] \]

(97) \[ \text{DP Maria,} \ 's \ [\text{NP} - \text{ing} \ [\text{VoiceP} \ t \ [\text{Voice} \ [\text{VP} \ read \ [\text{DP} \ Pride \ and \ Prejudice ] ] ] ] ] ] \]

(98) We remember Maria’s reading of *Pride and Prejudice*.
   a. Maria is the Agent of the reading *Pride and Prejudice* event.
   b. Maria is only related to the reading *Pride and Prejudice* event.

(99) We remember Maria’s reading *Pride and Prejudice*.
   a. Maria is the Agent of the reading *Pride and Prejudice* event.
   b. *Maria is only related to the reading *Pride and Prejudice* event.

**QUESTION:** Can we use the same test to detect the presence of Voice in statives\(^\text{16}\)?

- The genitive DP may express a general notion of relatedness to the state, given in (100).

- The genitive DP must express the holder relation to the state, given in (101).

(100) Glenn Beck’s hating of Obama was contagious.
   a. Glenn Beck is the Holder of the hating Obama state.
   b. Glenn Beck is only related to the hating Obama state.

(101) Glenn Beck’s hating Obama was contagious.
   a. Glenn Beck is the Holder of the hating Obama state.
   b. *Glenn Beck is only related to the hating Obama state.

Two further predictions arise from the hypothesis that Voice is the locus of EIS.

- By assigning accusative case to their objects, *poss-ing* gerunds should alternate in the availability of EIS given their object.

- By not assigning accusative case to their objects, *of-ing* gerunds should not alternate in the availability of EIS given their object.

\(^{16}\) The context given in (i) can be used to support a reading where Glenn Beck is only related to the hating Obama state.

(i) We all know that sometimes political pundits fake their personal feelings when speaking to their base. You know, anything for the rating!
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– Furthermore, the subjects of *of-ing* gerunds, lacking Voice, should be unable to license EIS.

To the extent these judgments are clear, all are born out.¹⁷

(102)  
  a. News anchors’ hating these politicians was contagious. (EIS)
  b. News anchors’ hating politicians was contagious. (*EIS)

(103)  
  a. News anchors’ hating of these politicians was contagious. (*EIS)
  b. News anchors’ hating of politicians was contagious. (*EIS)

5.4 Interim Conclusion 3

• EIS is a matter of aspect, i.e. the internal temporal make up of an individual; that is, the stages of an individual.

• Predicates are always predicating of stages of individuals.

  – Homogeneous predicates apply to homogeneous stages of the subject.
  – Quantized predicates apply to a quantized stage of the subject.

6 Extensions

States have several interesting aspectual characteristics, including lifetime effects and restrictions on temporal modifiers.

• How does the analysis above extend to these properties?

6.1 Lifetime Effects

Musan (1995, 1997) and others (Percus 1997; Maienborn 2004; Magri 2006) have proposed that lifetime effects are pragmatic.

• Musan (1997), for instance, captures lifetime effects through a conversational implicature.

  – Predicates in the past tense assert that a situation is over.
  – Individual-level predicates hold throughout an individual’s lifetime, (105a).

  – The implicature: If the subject was still alive, it would be more informative to use the present tense; therefore, the subject is dead. (105b).

¹⁷ Many thanks to E.T. Cunningham for her clear judgments on these data.
E.M. Husband

(104) Gregory was from America. \(\leadsto\) Gregory is dead.

(105) a. \([\text{be from America}]^{c} = \text{the function } f : D_{i} \rightarrow D_{(e,t)}, \text{ such that, for any } t \in D_{i}, f(t) = \text{the partial function } g : D \rightarrow 0, 1, \text{ such that, for any } x \in D, \ x \text{ is the domain of } g \text{ iff } x \text{ is alive at } t, \text{ and for any } x \text{ in the domain of } g, \ g(x) = 1 \text{ iff } x \text{ is from America at } t.\]

b. Since being from America is a property that, if it holds of an individual at all, holds of that individual over its entire lifetime, and since the speaker has implicated that Gregory’s beings from America is over, the speaker has implicated furthermore that Gregory is dead.

**QUESTION:** How does one know when a predicate is individual-level, especially given object effects?

- **SUGGESTION:** Lifetime effects are derived from the quantization of predicate.

- Homogeneous predicates apply to homogeneous stages of the subject, i.e. the individual itself.
  - Lifetime effects arise because all of the stages of the individual are put in the past.

- Quantized predicates apply to a quantized stage of the subject, i.e. a stage of the individual.
  - Lifetime effects do not arise because only some stage of the individual is put in the past.

**Evidence:** The lifetime effect is much weaker in (106b) compared to (106a).

(106) a. John owned banks. \(\leadsto\) John is dead.

b. John owned this bank. \(\nrightarrow\) John is dead.

### 6.2 Temporal Modification

Percus (1997) notes that not all temporal modification is ruled out for individual-level predicates.

(107) a. \#John was tall yesterday.

b. John was tall in his adulthood.

He argues that out-of-the-blue utterances are evaluated with respect to our world knowledge (world knowledge forms the basic context), and that part of our world knowledge is whether a property tends to be stable from one time point to another.
Quantity in States

(108) \( P \) is tendentially stable iff \( \forall s_1, s_2 \in Wd, x [P(s_1)(x) = 1 \& s_2 \text{ follows } s_1 \text{ temporally} \& P(s_2)(x) \text{ is defined}] \rightarrow P(s_2)(x) = 1 \)

- Properties which tend to not change from one situation to the next, i.e. those which tend to be stable over time (108), are not acceptable with temporal modifiers. . .
  - Unless a sufficient context is available which suspends their temporal stability.\(^{18}\)
  - Or the temporal modifier itself establishes a period of time compatible with our world knowledge.

**QUESTION:** How do we know that a predicate is tendentially stable, again, especially given object effects?

- **SUGGESTION:** Stability may ride on the part-structure of the state, i.e. can be determined in part by the semantics.

- Properties which tend to be stable (individual-level states) are homogeneous states.
  - The temporal contour of a homogeneous state is open-ended and extends indefinitely.
  - Only temporal modifiers which can encompass open ended temporal extents can modify homogeneous states.

- Properties which are do not tend to be stable (stage-level states) are quantized states.
  - A quantized state may have multiple distinct instances, which are not open-ended and can come and go.
  - The range of temporal modifiers is much wider for quantized states.

**Evidence:** Modification by *yesterday* is improved in (109b) compared to (109a).

(109) a. #John owned banks yesterday.
    b. John owned this bank yesterday.

\(^{18}\) Again, the role of context crops up concerning the interpretation of stative predicates. See Husband (2010) for further discussion.
7 Conclusions

- States, like events, are sensitive to the types of their objects.
  - Some evidence against requiring topics accounts for the availability of EIS.
  - The distinction which makes the right cut is quantization of objects.
  - An event composition account can be extended to include both events and states, unifying the treatment of the domain of eventualities.

- Stative predicates are also sensitive to the scales they are constructed from.
  - Scale structure is a kind of quantity structure.
  - An event composition account can also be extended to these cases.
  - Arguments and scales interact to derive the quantity of a predicate.

- EIS is an aspectual issue.
  - Stative predicates apply to stages of individuals.
  - The part-structure of the subject is inherited from the quantity of the state.
  - EIS is derived from the part-structure of the individual.
    - Homogeneous stative predicates apply to all the stages of the individual.
    - Quantized stative predicates apply to a stage of the individual, ensuring existence.

- Quantity derives some of the temporal behaviors of individuals in states.
A Licensing EIS by Locatives

Another hallmark of stage-level/individual-level states is their compatibility with locative modifiers (Carlson 1977; Kratzer 1995).

(110) a. Stage-level: John is available in the next room.
    b. Individual-level: #John is altruistic in the next room.

- We would expect a predicate’s compatibility with locative modifiers to be sensitive to the type of object.
- But, locative modifiers are acceptable with these predicates.
  - When present they license EIS, even when the object does not!, (111b).

(111) a. Tycoons own this house near here. (EIS)
    b. Tycoons own houses near here. (EIS)

Jäger (2001) and Kratzer & Selkirk (2007), operating under a Requiring Topics approach, propose that a silent locative or temporal pronoun could function as a topic.

- Stage-level predicates are compatible with locative modification.
- Individual-level predicates are incompatible with locative modification.

(112) a. Ich hab’ geträumt, dass (dann) der Rhein ausgetrocknet ist. (EIS)
    I have dreamed that (then) the Rhine dried up
    ‘I dreamt that the Rhine dried up (then).’

Two possibilities:

- Possibility 1: There is a second route to EIS: Silent/overt locatives may license EIS.
  - Note: the silent locative requires a particular stage of an individual, i.e. it localizes the individual (McNally 1998).

- Possibility 2: Locatives, silent or overt, change the aspectual character of the predicate.
  - Prepositions (and other categories) also influence aspect and may be part of aspectual composition (Winter 2006; Zwarts 2005).
B  Licensing EIS through Discourse Context

Glasbey (1997) argues that discourse context may license EIS.

• EIS is unlicensed in (113), but the addition of discourse context allows EIS in (114).19

(113) Drinkers were under-age.  (*EIS)

(114) John was shocked by his visit to the Red Lion. Drinkers were under-age, drugs were on sale, and a number of fights broke out while he was there.

Observation: (114) includes not only discourse context, but also an explicit locative, there (Jäger 2001; Kratzer & Selkirk 2007).

• (115) corrects for the locative (and the tense), and EIS appears to still be available (though the judgments here are far more questionable).

(115) The inspector was impressed on his visit to the Green Door and indicated so to the owner. “You’re doing a good job enforcing the age-limit. Drinkers are over 21 years old.”

Intuition: To the extent that EIS is licensed in (115), the discourse makes a location accessible.

• Suggestion: Discourse context may be used to license silent locatives (see Appendix A).

• Even for those predicates whose subjects Kratzer & Selkirk (2007) argues must be topics, discourse context may license EIS.

– These seem to be the same places where an overt locative can be used.

19 Glasbey (1997) does not provide judgments for the other predicates conjoined in (114). I find these acceptable with EIS, presumably due to past tense and the eventive predicate break out.

(i) a. Drugs were on sale.  (EIS)
   b. Fights broke out.  (EIS)
Mark visited the mental health hospital today and he told me, “Mental health patients are crazy (there)!”

The inspector was impressed on his visit to the Green Door and indicated so to the owner. ”You’re doing a good job enforcing the age-limit. Drinkers are over 21 years old (here).”

Ultimately, we may need to use other related phenomena (such as Kratzer & Selkirk’s (2007) observations about phrasal stress) to determine the presence of a silent locative.

C Structure of Scales and Positive Forms

Scales are defined as triples $\langle S, R, \Delta \rangle$ (Kennedy & McNally 2005).

- $S$ is a set of degrees.
- $R$ is an ordering on $S$ (either increasing ($\prec$) for ‘positive’ adjectives like warm or decreasing ($\succ$) for ‘negative’ adjectives like cool).
- $\Delta$ is a value that represents the dimension of measurement, such as temperature, width, depth, linear extent, temporal extent, etc.

Scale Closure Scales are either opened or closed (on either the top or the bottom).

(118) Open scale pattern
a. Her brother is completely ??tall/??short.
b. The pond is 100% ??deep/??shallow.
c. Max is fully ??eager/??uneager to help.

(119) Lower closed scale pattern
a. The pipe is fully ??bent/straight.
b. The room became 100% ??loud/quiet.
c. That author is completely ??famous/unknown.

(120) Upper closed scale pattern
a. We are fully certain/??uncertain.
b. This product is 100% pure/??impure.
c. The treatment is completely safe/??dangerous.

(121) Closed scale pattern
a. The room was 100% full/empty.
b. The flower was fully open/closed.
c. The figure was completely visible/invisible.
Table 1 Summary for Positive and Negative Adjective Judgments

<table>
<thead>
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<th>Open</th>
<th>L-Closed</th>
<th>U-Closed</th>
<th>Closed</th>
</tr>
</thead>
<tbody>
<tr>
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<td>??</td>
<td>??</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>(\text{Deg}<em>{\text{max}} \ A</em>{\text{neg}})</td>
<td>??</td>
<td>✓</td>
<td>??</td>
<td>✓</td>
</tr>
</tbody>
</table>

A typology of scale structures

- \(\langle D_{(0,1)}, R, \Delta \rangle\) (Totally) Open Scale
- \(\langle D_{[0,1]}, R, \Delta \rangle\) Lower Closed Scale
- \(\langle D_{(0,1]}, R, \Delta \rangle\) Upper Closed Scale
- \(\langle D_{[0,1]}, R, \Delta \rangle\) (Totally) Closed Scale

Scale Standard Adjectives vary on the standard of comparison they require.

- Relative Standard: Requires a contextually relevant comparison class to determine truth, (123).
- Absolute Standard: No such comparison class is required to determine truth, (124) and (125).

(123) a. The man is tall.
   b. The basketball player is tall.
   c. The watch was expensive.
   d. The moon landing was expensive.

(124) a. The baby is awake.
   b. The spot is visible.
   c. The door is open.
   d. The rod is bent.

(125) a. The glass is full.
   b. The road is flat.
   c. The door is closed.
   d. The rod is straight.

Scale standard is tightly related to scale closure.

- Relative standard \(\leftrightarrow\) Open scale.
- Absolute standard \(\leftrightarrow\) Closed scale.
C.1 The Positive Form

Adjectives denote measure functions, type $\langle e,d \rangle$.\(^{20}\)

(126) a. $[\text{tall}] = \lambda x[m_{\text{tall}}(x)]$
   b. $[\text{full}] = \lambda x[m_{\text{full}}(x)]$

A $pos$ morpheme is used to derive a property of individuals, type $\langle e,t \rangle$, from a measure function.

(127) $[pos] = \lambda g \in D_{\langle e,d \rangle} \lambda d \lambda x[R(g(x))(d)]$

- The analysis of $pos$ is tightly linked to the representation of scale structure.

C.1.1 Multiple $pos$ forms

A first approach requires multiple $pos$ forms, one for each type of scale.

(128) a. $[pos_{\text{open}}] = \lambda g \in D_{\langle e,d \rangle} \lambda x[g(x) \succeq \text{stnd}(g)]$
   b. $[pos_{\text{lower-closed}}] = \lambda g \in D_{\langle e,d \rangle} \lambda x[g(x) > \text{min}(g)]$
   c. $[pos_{\text{upper-closed}}] = \lambda g \in D_{\langle e,d \rangle} \lambda x[g(x) = \text{max}(g)]$

(129) a. $[pos \text{ tall}] = \lambda x[\text{tall}(x) \succeq \text{stnd}(\text{tall})]$
   b. $[pos \text{ bent}] = \lambda x[\text{bent}(x) > \text{min}(\text{bent})]$
   c. $[pos \text{ full}] = \lambda x[\text{full}(x) = \text{max}(\text{full})]$

- A problem: Scale structure is introduced twice in the representation: once for the adjective itself, and the second when applying the $pos$ morpheme.

C.1.2 Unified $pos$ Form and Economy

A second approach unifies the $pos$ forms (Kennedy 2007).

(130) $[pos] = \lambda g \in D_{\langle e,d \rangle} \lambda x[\text{stand-out}(g(x))(\text{stnd}(g))]$

\[
\text{stand-out}(g(x)) = \begin{cases} 
\lambda d.d > \text{min}(g) & \text{if } \text{min}(g) \text{ is defined}, \\
\lambda d.d = \text{max}(g) & \text{if } \text{max}(g) \text{ is defined}, \\
\lambda d.d > \text{stnd}(g) & \text{otherwise}.
\end{cases}
\]

(132) Interpretative Economy

Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions.

(133) a. $[pos \text{ tall}] = \lambda x[\text{stand-out}(\text{tall}(x))(\text{stnd}(\text{tall}))]$
   b. $[pos \text{ bent}] = \lambda x[\text{stand-out}(\text{bent}(x))(\text{stnd}(\text{bent}))]$
   c. $[pos \text{ full}] = \lambda x[\text{stand-out}(\text{full}(x))(\text{stnd}(\text{full}))]$

\(^{20}\) See Appendix C for an overview of scale structure.
• Two problems:
  – **stand-out** encodes the three-way split found in the multiple *pos* morphemes account outlined above.
  – This requires an economy condition, which is undesirable (Jacobson 1998).

C.1.3 Severing Scale Structure from the Adjective

A third approach eliminates scale structure from the representation of the adjectives themselves.

• Initial worries:
  – Adjectives certainly seem to be the source of scale structure.
  – The lexical scale structure of a wide variety of adjectives is used to explain the (un)acceptability of proportional modifiers, (134).

(134)??completely tall/deep/bent/loud/uncertain/dangerous/etc.

Some adjectives have variable behavior w.r.t. the kinds of scalar environments they can occur in.

“When *dry* is used to describe a (more or less) permanent, stable property such as the average degree of moisture in the atmosphere, it has a relative [open scale] interpretation. If, however, *dry* is used to describe a transient property like the amount of moisture on a surface, it has an absolute [closed scale] interpretation.”

(Kennedy & McNally 2005: p. 370)

• The comparative in (135a) allows for the possibility that both regions are considered to be dry, whereas the comparative in (135b) entails that the plates are not dry.

• Similarly, the negation in (136a) does not generate the entailment that the region is wet, but the negation in (136b) does generate the entailment that the glasses are wet.

• The variability in (135) and (136) corresponds to the acceptability of modification by *very*, (137).
  – Acceptable modification by *very* diagnoses open scale behavior.
Quantity in States

(135)  a. This region of the country is drier than that one (though both are dry).
b. The glasses are drier than the plates (#though both are dry).

(136)  a. This region of the country is not dry (but it’s not wet either).
b. The glasses are not dry (#though they’re not wet either).

(137)  a. This region of the country is very dry.
b. #The glasses are very dry.

The analysis: Maintain that there are multiple pos morphemes in the grammar, but that adjectives themselves do not encode a scale structure as part of their lexical representations.

- The grammar allows all adjectives to occur freely with any pos morpheme.
- Restrictions come about because the resulting concept underlying the meaning of the adjective is unable to coerce its meaning to suit the scalar environment, leading to unacceptability (Borer 2005a,b).

Consider the particular case of dry.

- dry with pos\textsubscript{open}
  - A relative standard is required.
  - The concept underlying dry coerces to allow this open scale meaning, (135a) and (136a).

- dry with pos\textsubscript{lower-closed}
  - A minimum absolute standard is required.
  - The concept underlying dry coerces to allow this minimum point closed scale meaning, (135b) and (136b).

- dry with pos\textsubscript{upper-closed}
  - A maximum absolute standard is required.
  - The concept underlying dry cannot be coerced to having a maximum point closed scale meaning.
  - This conflicts with the conceptual meaning of dry, no amount of contextual support is able to remedy the conflict between the grammar’s requirements and the concept’s flexibility, unacceptability results.
Also, Kennedy & McNally (2005) observe the distinction between “(more or less) permanent, stable” and “transient” properties of dry.

• Question: Is this related to the aspectual character of the stage-level/individual-level distinction?

  – Evidence from existential interpretation suggests this is so, (138), (139) and (140).

(138)  
  a. Regions are dry. (generic only)  
  b. Glasses are dry. (existential possible)

(139)  
  a. Three regions are dry. (proportional only)  
  b. Three glasses are dry. (cardinal possible)

(140)  
  a. #A region is dry.  
  b. A glass is dry.

• The extent to which existential interpretation of the subject is licensed in a sentence is related to the extent to which the predicate can receive a closed scale interpretation.

  – Can be diagnosed by the acceptability of degree modifiers.

• What is important then, is not so much the particular lexical items themselves, but the particular structures they are embedded in.
References

Kennedy, Chris & Beth Levin. 2002. Telicity corresponds to degree of change. Handout, Topics in the Grammar of Scalar Expressions, UCLA.


Quantity in States

Publications.